Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Technical Standards for Determining	)	
Eligibility For Satellite-Delivered Network	)	ET Docket No. 00-90
Signals Pursuant To the Satellite Home	)	
Viewer Improvement Act	)	

TO: The Commission

COMMENTS OF THE ASSOCIATION FOR MAXIMUM SERVICE TELEVISION, INC.

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SUMMARY

The Commission has been asked by Congress to examine whether the existing Grade B signal intensity standard remains appropriate for determining whether viewers are eligible for distant network service under the Satellite Home Viewer Act ("SHVA"), as revised and extended by the Satellite Home Viewer Improvement Act of 1999. Technical evidence developed over the past several decades, and reexamined just last year, demonstrates the continuing validity of the Grade B standard as the best measure for determining acceptable over-the-air television service. The Grade B standard is appropriately scrutinized periodically over the years and small tweaks are made to maintain the currency and vitality of the standard. Because implementation of the Grade B standard has evolved to take account of new developments, and because the laws of physics have not changed in the past 50 years, the Grade B standard remains the most accurate predictor of reliable, quality television service.

As recently as last year, the Commission concluded a comprehensive review of the Grade B intensity standard for purposes of determining SHVA eligibility, and found that the existing Grade B standard represents the best measure for determining whether a household receives an acceptable over-the-air television signal. The political and economic interests that drove that challenge to the Grade B intensity standard could not obscure the basic facts. As the Commission found, improvements in the technology of transmission and reception equipment since the Commission adopted the Grade B intensity standard have kept pace with increased viewer expectations of picture quality. The Commission should determine here, as it did last year, that there are no new technical data to support modification or replacement of the Grade B signal intensity standard, for SHVA purposes or otherwise.

Similarly, the DTV planning factors used to develop DTV allotments and technical standards, which have been shaped by intense industry and Commission debate and study, should be used to determine whether a DTV viewer is eligible for distant service under SHVA. In 1997, the Commission developed DTV allotments to mirror the Grade B service contours of analog television stations, establishing minimum signal strength values to define DTV service and adopting planning factors for DTV based on those factors generally understood to influence analog reception. These carefully developed measures reflect years of scientific study and analysis. We will learn more about the characteristics of DTV service and reception over time, but today, the planning factors developed in the DTV proceeding to approximate Grade B service remain by far the most appropriate, technically justified standards for determining acceptable DTV service.

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The Association for Maximum Service Television, Inc. ("MSTV")[1] submits these comments to the above-captioned Notice of Inquiry ("*NOI*"), which asks whether the Commission should consider a change to the existing Grade B signal intensity standard for purposes of determining whether satellite television subscribers are eligible to receive retransmitted distant signals of network stations under the Satellite Home Viewer Act ("SHVA"), as revised and extended by the Satellite Home Viewer Improvement Act of 1999 ("SHVIA").[2] We urge the Commission not to consider such a change, given the lack of evidence that any change is merited and the disruptive effect any such change would have on the over-the-air broadcast system. The Grade B signal intensity standard has been re-examined and

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[1] MSTV represents nearly 400 local television stations on technical issues relating to analog and digital television services. It worked closely with the Commission in conducting the original TASO study for the analog television service and developing the methodology for allotting and assigning digital television channels.

[2] *See* Consolidated Appropriations Act for 2000, Pub. L. 106-113, § 1000(9), 113 Stat. 1501 (enacting S. 1948, including the Satellite Home Viewer Improvement Act of 1999, Title I of the Intellectual Property and Communications Omnibus Reform Act of 1999).

reaffirmed through decades of careful scientific evaluation, taking into consideration various technical and other developments over the years. While a wealth of scientific testing and scrutiny supports retention of the existing Grade B standard for defining acceptable television service, there is no new technical data to support its modification or replacement. The Grade B signal intensity standard remains the most appropriate, scientifically sound standard for determining whether a household receives an adequate television signal, and should be retained without modification or alteration.

The Commission's current inquiry into the Grade B standard carries out its congressional mandate under SHVIA. From time to time, the Commission has appropriately questioned the continued vitality of the Grade B standard and adjusted it as appropriate. In this case, it is important to recognize that the Grade B debate rests not on new technical developments, but on the interests of satellite providers in retransmitting copyrighted network programming to as many viewers as possible, whether they receive an over-the-air network signal or not.[3] It was in this same context that the Commission instituted a proceeding to re-evaluate the Grade B intensity standard last year. Despite heavy pressure from the satellite

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[3] *See, e.g., ABC, Inc. v. PrimeTime 24,* 17 F. Supp. 2d 478, 481 (M.D.N.C. 1998) ("PrimeTime has ignored or turned a blind eye to the necessity of objective signal strength testing and thus willfully and repeatedly provides network programming to subscribers that are ineligible under SHVA."), *affirmed in relevant part*, 184 F.3d 348 (4th Cir. 1999); *CBS v. PrimeTime 24*, 9 F. Supp. 2d 1333, 1344 (S.D. Fla. 1998) ("This evidence demonstrates that PrimeTime 24 knew of the governing legal standard, but nevertheless chose to circumvent it."); *CBS, Inc. v. PrimeTime 24*, 1997 U.S. Dist. LEXIS 22637 (S.D. Fla. June 2, 1997) (Report and Recommendation of Magistrate Judge Johnson to Judge Nesbitt), *affirmed and adopted in relevant part*, 9 F. Supp. 2d 1333 (S.D. Fla. 1998) (evidence showed that PrimeTime 24 "actively markets its services to households across the country," "do[es] not take likely signal strength into account in signing up new customers, and will sell network programming to dish owners in any Zip Code in the United States," and "suggests that its distributors tell potential subscribers that, if they say that they receive an acceptable quality picture, they will not be eligible to receive network service.").

industry in that proceeding, the Commission determined in the *Grade B Order* that the Grade B standard should be retained – for purposes of determining eligibility to receive distant network signals under SHVA and otherwise.

Similarly, the Commission's definition of acceptable digital television ("DTV") service for SHVA purposes should be based on the exhaustive, years-long deliberation it already has conducted to determine the appropriate measures for DTV service. In 1997, the Commission developed DTV allotments to mirror the Grade B service contours of analog television stations. In so doing, the Commission established minimum signal strength values to define DTV service and adopted planning factors for DTV based on those factors generally understood to influence analog reception. These carefully developed measures are based on extensive and vigorous engineering analyses, and should be adopted as the standard for determining whether a household receives an adequate DTV signal for purposes of SHVA. While much remains to be learned regarding the characteristics of DTV service and reception, the planning factors developed in the DTV proceeding to approximate Grade B service remain by far the most appropriate, technically justified standards for determining acceptable DTV service.

I. NOTWITHSTANDING A HALF-CENTURY OF TECHNICAL AND POLITICAL SCRUTINY, THE GRADE B STANDARD CONTINUES TO BE THE MOST APPROPRIATE MEASURE OF ADEQUATE TELEVISION SERVICE

Our current system of free local television service rests on the coverage considerations defined by the Grade B intensity standard. Over the years, the Commission has reexamined the premises and technical rationales for the Grade B standard, and on every occasion has determined that the standard continues to be the most appropriate means for

determining acceptable over-the-air television service.[4] In the *NOI*, the Commission asks "whether the signal intensity standard used to determine the eligibility of satellite television subscribers to receive retransmitted distant signals of network stations should be modified or replaced."[5] The answer to this question is no. The evidence gathered by the Commission through decades of proceedings involving the television broadcast service demonstrates that the Grade B intensity standard remains valid today. No new, scientifically sound evidence has been presented to support modification of the Grade B principle for SHVA or other purposes.

A. The Grade B Standard Was Developed Through Comprehensive Scientific Study

The Grade B principle originally derived from the work of a series of government-industry committees formed by the Commission fifty years ago to study various matters relating to television allotment principles. One committee analyzed television propagation data with the objective of updating and improving the earlier propagation curves which had been based on theoretical considerations.[6] A second committee devoted its attention to determining what signal levels are required to produce a satisfactory television picture with a typical receiving installation and what desired-to-undesired signal ratios must be achieved in order to provide satisfactory service in the presence of interfering signals. A third committee devoted its efforts to defining in statistical terms various grades of television service to the

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[4] *See* Comments of MSTV to the *Grade B Proceeding*, CS Docket No. 98-201, RM No. 9335, RM No. 9345, at 14-20.

[5] *See Technical Standards for Determining Eligibility For Satellite-Delivered Network Signals Pursuant To the Satellite Home Viewer Improvement Act,* Notice of Inquiry, ET Docket No. 00-90 (adopted May 22, 2000), ¶ 1 ("*NOI*").

[6] This committee developed new empirical propagation curves for low-band and high-band VHF stations and for UHF stations to predict expected field strength as a function of distance and (continued...)

public. The work of these second and third committees led to the existing definitions of Grade A and Grade B television service, minimum field strengths for each grade, and ratios of desired-to-undesired signals for evaluating interference between stations.[7]

In 1957, the Commission established the Television Allotments Study Organization ("TASO") to examine the technical principles that should be applied in television allotments. TASO's world-respected studies represented work conducted over a two-year period by 271 engineers from a variety of organizations and backgrounds who comprised the six TASO engineering panels and their subsidiary committees. TASO conducted in-depth and comprehensive studies of all the engineering aspects of television propagation, transmission, reception and interference which were relevant to allotment and separations policies and standards. For example, TASO studied picture quality under various conditions, [8] different types and magnitude of interference under various conditions and their effects, station coverage, receiver systems including receiver performance characteristics and receiving antennas, and television reception.

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antenna height. These curves provided a basis for determining coverage and interference and provided the engineering foundation for sound allotments policies and standards.

[7] The Commission summarized the work of these committees in its *Third Further Notice of Proposed Rule Making* regarding television allotments. *See Television Broadcast Service,* Third Notice of Further Proposed Rule Making, 16 Fed. Reg. 3072 (Apr. 7, 1951).

[8] Specifically, TASO coordinated television viewer tests, where a large number of observers rated picture quality on a scale of 1 to 6, in the absence of interference. The scale indicates six grades of picture quality as follows: 1 – Excellent, 2 – Fine, 3 – Passable, 4 – Marginal, 5 – Inferior, 6 – Unusable. Additional observations also were conducted to evaluate impairments such as interference.

TASO's report, which was submitted to the Commission in 1959, substantiated the basic allotments policies and standards that the Commission had finalized in 1952.[9] Since that time, the Commission has on several occasions reconsidered whether using the Grade B standard to estimate a television broadcaster's over-the-air reach is still appropriate. To date, no technical, policy or other justification for abandoning the Grade B intensity standard has been provided and no alternative model has been proposed that is both more accurate and efficient.

B. The Grade B Principle Has Been Re-Affirmed Time And Again In Light Of Various Developments Over The Years

As the Commission has found over and over, the laws of physics have not changed since the TASO study was conducted. The Commission has consistently determined that use of the Grade B intensity standard serves the public interest by providing an accurate prediction of broadcast service.

1. 1975-1977

In 1975, the Commission issued a final decision in a proceeding to consider the technical validity of the Grade B intensity standard and proposed amendments to the engineering methods underlying that standard, as well as potential implications for changes to that standard for broadcasters, cable systems and land mobile services.[10] Although the Commission adopted revised formulae for calculating propagation curves to improve their predictive accuracy, in part by including a "terrain roughness factor" for use in appropriate circumstances, it did so only after careful study and evaluation of the validity of the proposed technical changes and their

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[9] *See Television Broadcast Service,* Sixth Report and Order, 41 F.C.C. 148 (adopted Apr. 11, 1952).

[10] *See Field Strength Curves for FM and TV Broadcast Stations*, Report and Order, 53 F.C.C.2d 855, 856 (adopted May 29, 1975) ("*Field Strength Order*").

implications for the Grade B contours.[11] The Commission then studied the implications of its new formulae for the Grade B principle and concluded that, taking into account developments in receiver technology, the Grade B intensity standard continued to predict accurately the areas in which viewers could receive an "acceptable" quality picture.[12]

The Commission considered challenges to the Grade B principle in other contexts, but again concluded there was no technical reason sufficient to justify undermining the Grade B intensity standard. For example, the Commission in 1975 denied a request by WETA for an experimental broadcast license in Washington, D.C., and for waiver of the co-channel and adjacent channel separation requirements.[13] WETA argued, in part, that "the TASO study, the last significant study of allotment principles, was conducted thirteen years ago and has been followed by the development of new technology, which offers hope of possible modification of the allotments scheme without undue degradation of the primary service of existing stations."[14] In its decision to deny the request, the Commission noted that WETA had failed to identify any specific technological developments or studies that would justify revisiting the TASO study:

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[11] *See id.* at 861-63; *see also Amendment of Part 76 to Modify or Eliminate the Use of Signal Strength Contours for Purposes of Cable Television System Regulation*, Notice of Proposed Rulemaking, 53 F.C.C.2d 1009, 1009 (adopted May 29, 1975) ("These new curves, proposed for adoption several years ago, were developed by a Government-Industry Working Group which utilized extensive propagation data accumulated since 1952. Our adoption of these curves followed several years of intensive engineering study and thorough analysis and consideration of the comments and replies elicited . . . ."). The Commission also carefully examined the engineering criticisms leveled at the new propagation curves, but found that these criticisms relied on misapplication of the available data. *See Field Strength Order* at 861-62.

[12] *See* G.S. Kalagian, *A Review of the Technical Planning Factors for VHF Television Service Research & Standards Division*, Office of Chief Engineer, FCC/DET RS 77-01 (Mar. 1, 1977).

[13] *See Application of Greater Washington Educational Telecommunications Association (WETA), Washington, D.C.*, Memorandum Opinion and Order, File No. BPEX-238, 53 F.C.C.2d 910 (adopted June 10, 1975).

[14] *See id.* at 912.

"Other than vague reference to technological developments which remain unidentified, nothing proposed in the way of equipment contemplates new or unique transmission or receiving facilities which would indicate that the present standards or the TASO results are no longer valid."[15] The challenges made today to the Grade B intensity standard similarly lack foundation, resting only on vague assertions of obsolescence rather than on concrete technical evidence.

2. 1988

In 1988, the Commission considered the applicability of the Grade B contours with respect to its cable regulations and again upheld the Grade B intensity standard as the best predictor of local television service.[16] Noting that the Grade B contour provides a theoretical prediction of broadcast coverage and signal availability, the Commission re-endorsed the Grade B principle:

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[15] *See id.* at 918. In another example, in considering a petition requesting ninety-six new, short-spaced drop-in channels and a reconsideration of its general distance separation policies, the Commission retained its distance separations requirements for UHF and VHF broadcast stations and thereby implicitly endorsed the Grade B principle on which those spacing requirements are based. *See Petition for Rulemaking to Amend Television Table of Assignments to Add New VHF Stations in the Top 100 Markets and to Assure that the New Stations Maximize Diversity of Ownership, Control and Programming*, Memorandum Opinion and Order and Notice of Proposed Rulemaking, 63 F.C.C.2d 840, 853-54 (adopted Mar. 7, 1977) ("*First Drop-Ins Order*"). Although the Commission conducted a thorough review of the engineering basis for its table of allotments, including an examination of the Grade B intensity standard and the distance separation requirements and interference levels which depend on that standard, it concluded that a reduction of its separation requirements was not justified. *See id.* at 856-57. After evaluating each proposed drop-in individually, the Commission concluded that only four proposals possessed sufficient potential benefits to justify further consideration in a rulemaking proceeding. *See id.* at 893. The Commission later granted all four drop-in proposals, but recognized that the decision represented "a significant departure from the past and cannot be taken lightly." *See Petition for Rulemaking to Amend Television Table of Assignments to Add New VHF Stations in the Top 100 Markets and to Assure that the New Stations Maximize Diversity of Ownership, Control and Programming*, Report and Order, 81 F.C.C.2d 233, 234 (adopted Sept. 9, 1980).

[16] *See Amendment of Parts 1, 63, and 76 of the Commission's Rules to Implement the Provisions of the Cable Communications Policy Act of 1984*, Second Report and Order, 3 FCC Rcd. 2617 (adopted Mar. 24, 1988) ("*Cable Order*").

> The Grade B contour has long been employed by the Commission to define the expected range in which a broadcast television station's signal *can be adequately received.* We also note that persons living in areas located in the outer reaches of the service areas of broadcast stations (for example, at the edge of a predicted Grade B contour) can, and generally do, take relatively simple measures such as installation of an improved roof-top antenna and careful location and orientation of that antenna to enhance their off-the-air reception. Thus, the predicted Grade B contour is more likely to approximate the area where a broadcast signal is, in fact, receivable.[17]

The Commission noted that "the higher level Grade A standard significantly underestimates signal coverage, and therefore, would be unacceptable as a standard for gauging signal availability."[18] The Commission also noted that many viewers beyond stations' Grade B contours receive adequate over-the-air signals, so that many broadcasters have local audiences well beyond those contours.[19] The Commission thus retained the Grade B intensity standard as an accurate predictor of signal availability.[20] The reasoning that sustained the Grade B intensity standard in 1988 applies with equal force today.

3. 1997

In 1997, after extensive in-depth deliberation over the issue, the Commission reaffirmed the Grade B intensity standard in the DTV context. The table of allotments recently developed for DTV was designed specifically to mirror the Grade B contours for traditional television service. The Commission and the entire rulemaking process devoted the most sophisticated engineering resources to developing a table for digital television based on the

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[17] *See id.* at 2619 (emphasis added).

[18] *See id.*

[19] *See id.* at 2620 n.22.

[20] *See id.* at 2625-26.

Commission's conviction that "providing DTV allotments that replicate the service areas of existing stations offers important benefits for both viewers and broadcasters."[21] The Commission concluded that a high degree of service replication – that is, replication of analog Grade B service – would ensure broadcasters could reach the same audience with both DTV and analog signals and provide viewers with new digital signals for the same stations they currently receive.[22]

4. 1999

In November 1998, the Commission initiated a rulemaking proceeding ("the *Grade B Proceeding*") to examine whether the existing Grade B signal intensity standard remained the appropriate measure for determining whether a particular household receives an acceptable over-the-air television signal, for purposes of SHVA and otherwise.[23] The Commission's goal in the *Grade B Proceeding* was "to identify more accurately, and consistent with the SHVA, those consumers who can and cannot receive their local broadcast network stations over-the-air."[24] After reviewing the long history supporting the Grade B standard and considering a total of 263 pleadings[25] filed by broadcasters, satellite providers, engineers, state

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[21] *See Advanced Television Systems and Their Impact upon the Existing Television Broadcast Service*, Sixth Report and Order, 12 FCC Rcd. 14588, 14605 (adopted Apr. 3, 1997) ("*DTV Sixth Report and Order*").

[22] *See id.* at 14605-06.

[23] *See Satellite Delivery of Network Signals to Unserved Households for Purposes of the Satellite Home Viewer Act, Part 73 Definition and Measurement of Signals of Grade B Intensity,* Notice of Proposed Rule Making, 13 FCC Rcd. 22977 (adopted Nov. 17, 1998).

[24] *See Satellite Delivery of Network Signals to Unserved Households for Purposes of the Satellite Home Viewer Act, Part 73 Definition and Measurement of Signals of Grade B Intensity,* Report and Order, 14 FCC Rcd. 2654, 2654 (adopted Feb. 1, 1999) (*"Grade B Order"*).

[25] There were 234 comments, 27 reply comments, and two supplemental filings filed and considered by the Commission in this proceeding. *See id.* at Appendix C.

and federal agencies, content owners, cable operators, consumers, and others, the Commission concluded in the *Grade B Order* that "the record in this proceeding provides an inadequate basis for changing the Grade B signal intensity values either generally or for purposes of the SHVA specifically."[26] In October 1999, the Commission issued the *Grade B Reconsideration Order* reaffirming its decision to retain the existing Grade B intensity standard without modification.[27] No new evidence has come to light in the short time since the Commission's decisions in the *Grade B Proceeding* that would warrant jettisoning the 50 years of technical evaluation and scrutiny that repeatedly have upheld the Grade B signal intensity standard as an accurate measure of reliable television service.

While retaining the existing Grade B intensity standard, the Commission in the *Grade B Proceeding* refined the methods used to measure and predict signal intensity at individual locations. Noting that "[i]ndividual testing is the key mechanism under the SHVA for proving that a specific household is unserved and, therefore, eligible to receive satellite delivery of network affiliated television stations," the Commission adopted a new procedure for testing signal intensity at particular households.[28] The Commission also endorsed a predictive model for predicting whether a Grade B intensity signal will be received at particular locations.[29] The Commission explained: "The model we endorse is a version of Longley-Rice 1.2.2 that we have adapted for predicting signal strength at individual locations. Called 'Individual Location

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[26] *See id.* at 2674.

[27] *See Satellite Delivery of Network Signals to Unserved Households for Purposes of the Satellite Home Viewer Act, Part 73 Definition and Measurement of Signals of Grade B Intensity,* Order on Reconsideration, 14 FCC Rcd. 17373 (adopted October 5, 1999) (*"Grade B Reconsideration Order"*).

[28] *See Grade B Order* at 2675-82.

[29] *See id.* at 2682-95.

Longley-Rice' or 'ILLR,' it is similar to the point-to-point predictive model we established for digital television (DTV) allocations."[30] The Commission refined the ILLR method in May 2000 by assigning clutter loss values based on land use and land cover ("LULC") categories ranging from open land to urban environments, which were derived from a database of land variations published by the United States Geological Survey.[31] The Commission found that the LULC database is "the best resource available at this time for defining land use and clutter characteristics, and . . . that its use would, on balance, significantly enhance the accuracy of predictions made with the ILLR model."[32]

II. THERE IS NO EVIDENCE TO SUPPORT ALTERING THE PLANNING FACTORS THAT UNDERLIE THE GRADE B SIGNAL INTENSITY STANDARD

In the *NOI*, the Commission seeks comment on "whether there have been any technological developments in television system equipment, over-the-air television viewer installations or picture quality expectations that would warrant a significant modification to the planning factors on which the current Grade B standard for household eligibility for distant TV network signal reception under SHVA is based."[33] The Commission also asks whether "any of the planning factors for Grade A [are] more appropriate than the corresponding Grade B factors for determining distant signal reception eligibility."[34] In both cases, the answer is no. While there have been repeated inquiries into and affirmations of the Grade B intensity standard as the

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[30] *See id.* at 2687.

[31] *See Establishment of an Improved Model for Predicting the Broadcast Television Field Strength Received at Individual Locations,* First Report and Order, ET Docket No. 00-11 (adopted May 22, 2000).

[32] *See id.* at ¶ 10.

[33] *See NOI* at ¶ 11.

[34] *See id.*

best measure for predicting television service, there is no scientific evidence to support modification of the planning factors that define the standard. Indeed, the Commission reached this conclusion just last year in the *Grade B Order*. Among other things, the Commission found that "the evidence in the record suggests that some of the environmental and technical changes that have taken place trend in opposite directions and tend to cancel each other out."[35] Therefore, the Commission concluded that no change to the Grade B planning factors was warranted.

A. Receiver Noise Figure, Signal-To-Noise Ratio, And Service Quality

The Commission seeks comment on whether the planning factors for the Grade A and Grade B standards (set forth in Tables 1 and 2 of the *NOI*) are still valid for the average television receiver employed in the home today, and whether advances in the technology of television receivers have, at a minimum, kept pace with today's consumer expectations for better reception of television service.[36] The existing planning factors continue to reflect quality service for the average television receiver, and should be retained. Opponents of the Grade B standard say that today's viewers expect more than Grade B signal quality. While viewer perceptions may be more demanding today than in previous years, this trend has been more than compensated for by the marked advances in the performance of receivers and receiving equipment.[37] Specifically, while it may be true that viewer expectations have increased,

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[35] *See Grade B Order* at 2674.

[36] *See NOI* at ¶ 12.

[37] This improvement in reception technology was recognized as early as 1980, when the Commission considered increasing the number of VHF television allotments. *See Table of Television Channel Allotments*, Notice of Proposed Rulemaking, 83 F.C.C.2d 51, 84 (adopted Sept. 18, 1980) ("[T]he maturation of home rooftop antenna technology to provide a more consistently high quality antenna means that today rural viewers are now more likely to employ a (continued...)

resulting in demand for higher quality pictures, the noise levels of television receivers have dramatically fallen well below the levels assumed by TASO in the 1950s. Thus, the Grade B signal maintains its level of acceptability.

The Commission reached this conclusion in the *Grade B Order,* explaining:

> In the 1950s low cost electronic technology at television frequencies was hard to find. Therefore, the planning factors had to be set low enough to ensure that television sets could be affordable by the public. The noise figure used in the planning factors serves as a good example. . . . In the 1950s, the television tuner technology consisted of low cost noisy tubes and attached components. Today, this technology has progressed to modern solid state components that produce lower set noise. Thus, although many developments have taken place since the standards were first adopted, it is not clear that increases in the values involved are warranted.[38]

Because changes in viewer appetites for better video quality and audio fidelity and advances in television technology offset each other, the Grade B intensity standard remains an accurate reflection of "acceptable" service.[39] Indeed, if technological and other developments were taken into account, the net result would suggest a *decrease* in the receiver noise figure, rather than an increase. In fact, the Commission relied on continued improvements in receiver technology when it developed allotments for DTV. As the Commission explained in the *NOI,* in "dealing with the planning factors for DTV, the Commission recognized that receivers have in many cases improved beyond the current Commission requirements and could get even better in the future. In that proceeding, the Commission used noise figure planning factors for DTV

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receiving antenna superior to their 1952 counterpart. Furthermore, recent advances in television reception technology may result in the availability of even better reception systems before the effect of the proposed rule changes occurs.").

[38] *See Grade B Order* at 2674.

[39] *See* MSTV Comments to the *Grade B Proceeding*, Engineering Statement of Jules Cohen at 5-6.

receivers that, for the UHF band of operation, are some 7 dB better than the current requirement set forth in Section 15.117 of our rules."[40]

As the Commission concluded in the *Grade B Order,* there is no technical reason why the TASO service grades underlying the Grade B standard would no longer adequately reflect what is regarded as quality service. The Commission stated:

> The first attack on the existing standards has to do with the possibility that viewers' expectations as to signal quality have increased over time. If this were the case a stronger signal would be needed to produce a picture that would now be regarded as acceptable. Although there is some speculation in the comments that viewer expectations have changed, no current study documents this or replicates the initial TASO study that correlated viewer judgments of television picture quality with specific signal levels.[41]

The Commission's conclusion in the *Grade B Order* remains valid today. To date, there still have been no comprehensive engineering analyses comparable to the TASO study and no scientific studies that refute the picture quality standards underlying the Grade B signal intensity standard.[42]

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[40] *See NOI* at ¶ 12.

[41] *See Grade B Order* at 2673. The Commission rejected certain tests based on flawed testing methodologies and conditions. For example, it stated that "[m]any of these recent tests were conducted by cable television sponsors using viewers who may have expected to pay for these better pictures." *See id. See also NOI* at ¶ 14 ("[S]everal recent tests were conducted by cable television sponsors using as subjects viewers who may have expected to receive, and to pay for, higher quality pictures. Those subjects, however, may not be representative of audiences relying on over-the-air reception."). Just as it was inappropriate to base over-the-air viewer expectations on cable picture standards, it is inappropriate now to adopt a signal strength value for SHVA purposes that is based on the quality of subscription satellite pictures.

[42] As the Commission observes in the *NOI,* "no current study documents this purported change [in viewer expectations] or replicates the methodology of the initial TASO study that correlated viewer judgments of television picture quality with specific signal levels." *See NOI* at ¶ 14.

B. Transmission Line Loss And Antenna Gain

The current receiving antenna system gains used for the Grade A and Grade B standards continue to be appropriate for analog television reception. In the *Grade B Order,* the Commission stated that parties seeking amendment of the Grade B standard "argued that radio frequency noise in outlying areas has increased so that rural areas are today more akin to urban areas of the 1950's, that the typical household now has multiple television receivers necessitating antenna lead splitters that increase line loss, and that antenna gain figures (particularly in the UHF frequencies) should be re-evaluated."[43] After carefully evaluating these arguments, the Commission concluded that "the technology of receivers and antennas has kept pace with changing consumer expectations and increased noise" and declined to change the receiving antenna gain planning factor used to define the Grade B standard.[44] There is no new evidence to suggest that the Commission should change its reasoned determination in the *Grade B Proceeding.*

The Commission in the *NOI* asks whether it is appropriate to assume an outdoor, directional gain antenna model for over-the-air reception of television when determining eligibility under SHVA. The answer is yes. As the Commission itself points out, "reception of satellite delivered television is generally based on the installation of a directional outdoor antenna."[45] Therefore, it is appropriate to expect viewers to select receiving equipment and antennas that are suitable for their particular locations and preferences to improve the picture quality of an over-the-air television signal. By taking such basic steps, many households can use

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[43] *See Grade B Order* at 2673.

[44] *See id.* at 2674.

[45] *See NOI* at ¶ 17.

conventional receiving equipment to compensate for signal degradation that occurs over distance or due to terrain and can thereby receive a high-quality, over-the-air broadcast picture.[46] These households are not in fact "unserved" because, in reality, these particular locations enjoy perfectly acceptable over-the-air service. In fact, viewers can achieve gains of up to 20 dB over reference dipoles in the UHF band by using affordable, properly installed, commercially available antenna equipment.[47] Thus, the picture quality these households actually receive will be superior to the reception predicted using the Grade B intensity standard's equipment presumptions.

The antenna gain planning factors that underlie the Grade B intensity standard presume standard (mid-range) quality antennas and receiving equipment. They do not presume extraordinary measures. In fact, the Commission in the *Grade B Order* refined the determination of whether a particular household receives a Grade B intensity signal (for purposes of both signal testing and predictions using the ILLR methodology) by assuming only a twenty-foot antenna elevation for one-story buildings, and a thirty-foot elevation for buildings that are taller than one-

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[46] *See, e.g., Cable Order* at 2619 ("persons living in areas located in the outer reaches of the service areas of broadcast stations (for example, at the edge of a predicted Grade B contour) can, and generally do, take relatively simple measures such as installation of an improved roof-top antenna and careful location and orientation of that antenna to enhance their off-the-air reception.").

[47] *See, e.g.,* Comments of the Electronics Technicians Association, International, Inc., to the *Grade B Proceeding*, at 14-15 (reporting gains of up to 24 dB over reference dipoles with appropriate equipment).

story.[48] Particularly in light of this recent refinement, there is no evidence to support alteration of the current antenna gain planning factors for the Grade B standard.[49]

C. Field Strength Variability

In the *NOI,* the Commission seeks comment on whether the Grade B intensity standard's field strength variability factors are appropriate for determining eligibility under SHVA.[50] In adopting standards for television broadcasting, the Commission relied on three inter-dependent technical parameters to describe service to an area – time, location and picture quality. Specifically, the Commission defined service in terms of a minimum signal level that is received at the input of a television receiver to provide a desired quality of service. Because the field strengths that produce the receiver signals vary with time and from location to location, it was necessary to include some of the statistics reflecting this variability in the description and protection of the service.

In order to develop the table of allotments and accompanying technical requirements, the Commission developed service standards (such as the Grade A and Grade B standards) that are based on definitions of *minimum* field strengths or intensity levels received within those service areas. These levels are defined in terms of joint probability distribution functions of time and location[51] – expressed in percentages – and relate to reception of an

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[48] *See Grade B Order* at 2680-81, 2687-89. Under the prior approach, a thirty-foot antenna was assumed for all households.

[49] The Commission in paragraph 16 of the *NOI* asks whether there have been any studies of typical home television receiving installations since the 1981 NTIA Report. MSTV is not aware of any such studies.

[50] *See NOI* at ¶ 22.

[51] The technical representation of this probability distribution function is F(L,T), where L represents the percent of location and T represents the percent of time.

"acceptable" quality picture[52] using an average receiving antenna installation. The Grade B intensity standard is defined as the signal level required to receive an "acceptable" broadcast picture for at least 90 percent of the time at 50 percent of the locations. Unfortunately, the time and location statistics of the Grade B intensity standard are easily misunderstood. While the predictive Grade B contour indicates the boundary at which 50 percent of the locations are predicted to receive "acceptable" service 90 percent of the time, it does not suggest that up to 50 percent of the locations on that contour are cut off from broadcast service and receive no picture. Instead, these locations may receive a picture that is slightly degraded assuming average receiving equipment. Similarly, it is not the case that locations predicted to receive an "acceptable" picture 90 percent of the time receive no picture 10 percent of the time. During these periods, these locations simply are predicted to receive a signal that is degraded slightly below "acceptable" viewing levels presuming average receiving equipment.[53]

When the Commission re-evaluated the Grade B intensity standard for SHVA purposes in the *Grade B Proceeding,* it upheld the time, location and confidence variability factors as appropriate for determining acceptable television service for today's viewers. While it developed the ILLR prediction methodology to refine predictions of television service at particular locations, it retained the existing filed strength variability factors that define Grade B signal intensity.[54] As the Commission explained in the *Grade B Order,* "the Grade B values

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[52] An "acceptable" picture was defined as a TASO Grade 3 picture, defined by TASO as "Passable. The picture is of acceptable quality. Interference is not objectionable."

[53] For example, the picture might occasionally degrade from a TASO Grade 3 picture to a TASO Grade 4 (*i.e.*, "Marginal") picture.

[54] *See Grade B Order* at 2687-89.

already predict the existence of an acceptable television picture at least 90% of the time, ..."[55] There is no evidence that the picture degradations that might be experienced 10% of the time (assuming average equipment) are significant enough to render the signal unacceptable to viewers. Indeed, as noted above, many viewers may be unaware of these degradations because they use high-quality antenna and receiving equipment that exceeds the equipment assumed in the planning factors. Ultimately, the Commission determined in the *Grade B Order* that increasing the variability factors in an effort to predict an acceptable picture with greater than 90% confidence would "overpredict the number of truly unserved households," and could create "several undesired effects," such as consumer confusion and frustration.[56] The Commission's reasoning remains sound.

In the *NOI,* the Commission sought comment on whether the current location variability factor used in the Grade B standard is appropriate, since SHVA eligibility is determined by use of the ILLR propagation predictive model for individual locations.[57] With regard to the location variability standard, the Commission explained in the *Grade B Order:*

> In the ILLR, location variability becomes effectively irrelevant because only one location (*e.g.,* a single household) is considered. The individual mode merges location variability (the measurable observable differences between dissimilar locations) and so-called situational variability (the small, often hidden, differences between similar or identical locations) into the statistical confidence factor.[58]

Thus, there is no justification for changing the location variability planning factor for Grade B signal intensity. We note that while there is no benefit to removing this planning factor for

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[55] *See id.* at 2689.

[56] *See id.* at 2690-91.

[57] *See NOI* at ¶ 22.

[58] *See Grade B Order* at 2691.

SHVA predictive purposes, tampering with the Grade B intensity standard could have unintended and harmful repercussions. The Commission in the *Grade B Proceeding* recognized these risks, noting that establishing another set of Grade B values solely for the purpose of SHVA "is likely to create confusion for the broadcast industry" and "would risk harm to the network/affiliate relationship by creating an implication that another, different Grade B definition might be more suitable for other situations that are not contemplated in this proceeding."[59]

D. Environmental Noise

The Commission requests comment on whether the planning factor values currently used to account for environmental noise are appropriate for a standard to determine SHVA eligibility.[60] Because these values represent the best figures currently available regarding environmental noise, they should be retained. To MSTV's knowledge, there are no technical studies that suggest a need for a Grade B environmental noise factor (*i.e.*, a counterpart to the urban noise factor value used in determining the Grade A field intensity levels) for purposes of determining SHVA eligibility. The existing planning factor values should not be changed without a scientific study based on comprehensive measurements of environmental noise.

E. Multipath Interference

In the *NOI,* the Commission seeks comment on "whether the effects of multipath interference should be included in the eligibility standards" and, if so, how they should be accounted for.[61] The Commission states that it is "not aware of any methodology for predicting

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[59] *See id.* at 2675.

[60] *See NOI* at ¶ 24.

[61] *See NOI* at ¶ 27.

the specifics of ghosting at a given location."[62] As the Commission points out, "[s]imply expressing the desired-to-undesired signal ratio, as is done in most interference analyses, is insufficient to quantify the impact of ghosting because the number of echoes, their phase relationships, and resultant delay are also important physical characteristics of ghosting."[63] Because there is no scientifically accepted model for predicting ghosting, ghosting cannot be incorporated into the Grade B intensity standard and should not be considered in determining eligibility for distant network service under SHVA.

The Commission properly reached this conclusion in the *Grade B Proceeding,* and there have been no new technical developments that would justify a departure from this conclusion. In the *Grade B Order,* the Commission explained that increasing signal strength also increases the severity of ghosting, noting that even the engineer retained by a satellite provider to advocate increasing the Grade B signal intensity standard "acknowledges that his proposed values do not deal with the problem of 'multipathing' (*i.e.*, ghosting or multiple images due to signal reflection) and acknowledges that the stronger signal intensity he proposes 'may make the effect of multipathing more pronounced.'"[64] The Commission explained that in ghosting "as the signal strength increases, the 'noise' in the picture is reduced. Unfortunately, noise (*e.g.*, electrical noise in the tuner or environment) masks ghosting. Thus, as the noise is reduced, which is a benefit to picture quality in the absence of multipath problems, the ghosting disturbance becomes more noticeable."[65]

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[62] *See id.* at ¶ 26.

[63] *See id.* at ¶ 27.

[64] *See Grade B Order* at 2671 (citation omitted).

[65] *See id.* at n.101.

The Commission upheld its conclusions regarding multipath problems in the *Grade B Reconsideration Order.* In response to the assertion by one petitioner (EchoStar) that multipath issues had not been adequately addressed in the *Grade B Order,* the Commission replied:

> We addressed multipathing in the *Order* on several occasions and, as with the Grade B definition issue, EchoStar has not offered any additional facts or new arguments that warrant a change in our conclusions. We recognize that ghosting is a problem that affects television pictures but note, as we did in the *Order,* that there is no simple solution. For example, raising the Grade B values to give a consumer a stronger television signal could actually exacerbate the problem of multipathing. As the signal strength increases, "noise" or "snow" in a television picture may be reduced, but the chance of ghosting increases. Moreover, the multipath "interference" created by the same signal is very difficult to measure objectively.[66]

The Commission went on to point out that while it welcomed "concrete solutions to the ghosting problem, any solution must be objective and verifiable."[67] Because no one had provided "any new facts or arguments that describe how to predict and measure multipathing," the Commission stood by its decision not to consider multipathing in determining eligibility under SHVA.[68] In the less than nine months since the Commission issued the *Grade B Reconsideration Order,* there have been no new scientific discoveries or evidence that would support a departure from the Commission's decision.

III. THE COMMISSION SHOULD USE THE EXISTING VALUES THAT DEFINE DTV SERVICE TO DETERMINE ELIGIBILITY UNDER SHVA

The Commission requests comment on whether the DTV noise-limited service contour values that define DTV service under the Commission's rules should be used to

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[66] *Grade B Reconsideration Order* at 17379.

[67] *See id.*

[68] *See id.*

determine whether a DTV viewer is eligible to receive satellite retransmissions of distant network signals under SHVA.[69] These contour values and the planning factors that underlie them (set forth in Tables 3 and 4 of the *NOI*) were established only after many years of technical study, analysis and debate, and represent the best available measures of DTV service. The existing values represent the cooperative efforts of the public and private sectors to develop a DTV service that replicates the analog service enjoyed by the public, and should be the basis on which DTV service is determined under SHVA.

In the *DTV Sixth Report and Order,* the Commission explained that "[f]or purposes of service replication, the service or coverage area of a DTV allotment is the predicted noise-limited service area, contained within the Grade B contour of the NTSC station associated with that allotment, less any area where interference from other DTV or NTSC operations may occur."[70] The planning factors adopted by the Commission to implement this policy represent the work of the Commission, numerous industry members, and engineers over the better part of the decade, including the comprehensive efforts of the Advanced Television Systems Committee ("ATSC") to develop an appropriate DTV standard.[71] In the *DTV Sixth Report and Order*, the Commission noted that "significant industry efforts have gone into developing the technical

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[69] *See NOI* at ¶¶ 29-30.

[70] *See DTV Sixth Report and Order* at 14607.

[71] *See, e.g., id.* at 14676 ("We are generally adopting our proposals to use the performance characteristics of the ATSC DTV system in developing DTV allotments and have used these characteristics in developing the DTV Table of Allotments adopted herein. We are, however, amending the proposed planning factors to take into account the concerns and suggestions present by the Joint Broadcasters and other commenting parties. First, we have constructed the DTV Table of Allotments adopted herein using the new receiver noise figures recommended by the Broadcasters Caucus Technical Committee. That is, a 10 dB noise figure is used for the VHF band and a 7 dB noise figure is used for the UHF band. In addition, the Table takes into account the 'dipole correction factor' for UHF frequencies recommended by the Joint Broadcasters.").

planning criteria to be used in the implementation of DTV."[72] Similarly, the Commission itself has devoted tremendous time, effort, and resources to develop and refine the current DTV planning factors. As the DTV service develops and more DTV stations go on the air, new evidence may suggest a need to amend these values to reflect the real-world experiences and expectations of DTV viewers. Although there are some 130 DTV stations on the air, it is still premature to contemplate changes to the existing contour values and planning factors that define DTV service.

[72] *See id.* at 14625.

IV. CONCLUSION.

For the foregoing reasons, the Commission should retain the existing Grade B signal intensity standard without modification as the standard for determining eligibility for distant network signals under SHVA. In addition, the Commission should adopt the existing DTV noise-limited contour values and planning factors that define DTV service, as set forth in Tables 3 and 4 of the *NOI,* as the standard for determining whether a DTV viewer is eligible for distant network service under SHVA.

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